ISSN 2278-8808 SJIF 2014 = 4.889
An International Peer Reviewed & Referred
SCHOLARLY RESEARCH JOURNAL
FOR INTERDISCIPLINARY STUDIES

A PSEUDOPHYLLIDEAN SENGA MADHUKARII SP. NOV. FROM A FRESHWATER FISH MASTACEMBELUS ARMATUS FROM GODAVARI BASIN MAHARASHTRA STATE (INDIA).

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Abstract

The present communication deals with the description of a new species of genus Senga madhukarii from fresh water fish Mastacembelus armatus from Godavari basin provided new data on their morphology. The present worm differ from the known species of the genus in the shape and size of the scolex, number of hooks and arrangement of rostellum, shape of Segment, number of testes, position of cirrus pouch and arrangement of vitellaria.

Keywords: *- Godavari basin, Mastacembelus armatus, Senga madhukarii Sp.Nov.*

Introduction:- The genus *Senga* was established by Dollfus, 1934 with its type species *S. besnardi* from *Betta splendens* at Vinecunes, France. *S. ophiocephalina* Tseng, 1933 as

Anchistrocephalus ophiocephalina from *Ophiocephalus argus* at Taimen, China and identified with a form previously recorded by Southwell, 1913 as *Anchitrocephalus polyptera* (*Anchitrocephalus*) Monticelli, 1890 Syn. *Anchistrocephalus* Luhe, 1899 from *Ophiocephalus striatus* in Bengal, India *S. pcynomera* Woodland, 1924 as *Bothriocephalus pcynomera* from *Ophiocephalus marulius* at Allahabad, India. *S. lucknowensis*. Johri, 1956 from *Mastacembelus armatus* in India. Fernando and Furtado, 1963 recorded *S. malayana* from *Channa striata*, *S. parva* and *S. filiformis* from *Channa micropeltes* at Malacca. Ramadevi and Hanumantha Rao, 1966 reported the plerocercoid of *Senga* sp. from *Panchax panchax*. Tadros, 1968 synomised the genus *Senga* with the genus *Polyonchobothrium* and proposed new combinations for the species. Furtado and Chauhan, 1971 reported *S. pahangensis* from *Channa micropeltes* at Tesak Bera. Shinde, 1972 redescribed *S. besnardi* from *Ophiocephalus gachua* in India. Ramadevi and Rao, 1973 reported another species of *S. visakhapatanamensis* India. Ramadevi (1976) described the life cycle of *S. visakhapatnamensis* from *Ophiocephalus punctatus* in lake at Kondakaria, Andhra Pradesh, India. But they do not agree with Tadors statements. Wardle, McLeod and Radinovsky, 1974 put *Senga* as a distinct genus in the family Ptychobothridae. Deshmukh, 1980 reported *S. khami* from *Ophicephalus marulius*, a fresh water fish from Kham river at Aurangabad. Jadhav and Shinde, 1980 reported *S. godavarii* from *M. armatus* at Nanded, M.S. India. One more species *S. aurangabadensis* was added by Jadhav and Shinde, 1980 from *M. armatus* at Aurangabad M.S. India. A new addition made by Kadam et.al. 1981 as *S. paithaensis* from host *M. armatus.* Majid et. al., 1984 added *S. raoi* and *S. jagannathae* from *Channa punctatus.* Two more new species erected by Jadhav et.al. 1991 as *S. maharashtrii* and *S.gachuae* from the intestine of *M. armatus.* Monzer Hasnain, 1992 added *S. chauhani* from *Channa punctatus*. Tat and Jadhav, 1997 added *S. mohekarae* from the intestine of the *M. armatus*, at Parli, Dist. Beed, M.S. India. Patil and Jadhav added *S. tappi* from *M. armatus* in 2003. Jadhav, 2005 made the review article of the genus *Senga* from freshwater fishes from Maharashtra state, India. Pande et.al, 2006 added two new species i.e. *S. ayodhensis* from *Amphinuous cuchia* and *S. baughi* from *Rita rita.* Kalse A. T, 2009 added one new species *senga panzarensis* from *Mastacembelus armatus*. Bhure et.al, 2010 added one new species *S.madhavii*

from *Mastacembelus armatus.* Lastly Pardeshi P.R, 2011 added one new species *Senga rupchandensis* from *Channa striatus*.

MATERIALS AND METHODS: The present specimens were recorded from the intestine of the freshly killed fresh water fish *Mastacembelus armatus* from Godavari Basin during the period of June 2009-May 2011.Each fish was dissected and examined in all parts like fins, gills, scales, and visceral organs under a microscope. Fishes were opened up dorso-ventrally and the internal organs examined. The entire digestive system was removed and placed in a Petri dish with physiological saline. Infection of each group of parasites was treated as follows: collected parasites were first relaxed and then fixed in hot 4% formalin and stain using Harris haematoxyline. Stained parasites were washed in distilled water, dehydrated in ascending grades of alcohol, cleared in xylene, mounted in D.P.X. Drawings were made using a camera lucida.

Description of parasite *Senga madhukarii:-* Six mature specimens were collected from the intestine of a fresh water fish *Mastacembelus armatus* (Lacepede, 1800) from Godavari basin in the month of April, 2010.

All the cestodes are long, consisting of scolex, immature, mature and gravid proglottids.

The scolex is large well developed, cylindrical in shape and measures 5.23(5.22-5.24) in length and 2.32 (1.98-2.67) in breadth. Scolex bear rostellum armed with hooks, 45 in numbers and measures 29.19(12.9-15.48) in length and 2.80(2.38-3.22) in breadth. The scolex bears two bothria, spatulate, overlapping each other, long, extended up to posterior end of scolex, and measures 4.43(4.28-4.57) in length and 0.66(0.57-0.76) in breadth.

Neck is absent.

Mature segment medium in size rectangular in shape and measures 0.89(0.83-0.93) in length and 8.24(8.01-8.4) in breadth. The testes are oval in shape, medium in size 130 in numbers, spread in the segment at each side of the ovary and measures 0.30(0.26-0.34) in length and 0.13(0.11-0.15) in breadth.

The cirrus pouch is oval medium in size anterior to ovary situated in the middle of the segment and measures 0.43(0.38-0.49) in length and 0.17(0.15-0.19) in breadth. The cirrus is thin tube measures 0.24(0.22-0.26) in length and 0.057(0.03-0.07) in breadth.

Ovary is bilobed, each lobe is different with long isthmus and measures 3.4(3.2-3.6) in length 0.53(0.49-0.57) in breadth, situated in the middle of the segment. The vagina is thin coiled tube, starts from genital pore posterior to cirrus pouch measures 0.28(0.26-0.30) in length and 0.17(0.15-0.19) in breadth. Genital pore small, rounded and measures 0.22 in length and breadth. The uterus is saccular, filled with eggs and measures 0.14(0.10-0.18) in length and 0.34(0.21-0.46) in breadth. Eggs are elongated, tapering at both ends.

Vitellaria are follicular, arranged in two to three rows at each lateral margin of the segment.

DISCUSSION: The genus *Senga* was established by Dollfus, 1934 with the type species *Senga besnardi* from *Betta splendens*. The present worm comes closer to all the known species of the genus *Senga* Dollfus, 1934 in general topography of organs. But differs due to some characters from following species.

1} The present worm differs from *S. besnardi* Dollfus, 1934 in the shape of scolex which is triangular, hooks 50 in numbers, testes 160-175 in numbers, ovary compact and reported from *Betta splendens* in France.

2}The present cestode differs from *S. ophiocephalina* Teseng,1933 in having hooks 47-50 in numbers, testes 50-55 in numbers, ovary bilobed but equatorial in position, vitellaria lobate and reported from *Philocephalus argua argua* in China.

3}The present tapeworm differs from *S. pcynomera* Woodland, 1924 in having scolex elongated, hooks 68 in numbers, mature segments are indistinct, ovary discontinuous into two groups and reported from *Philocephalus marulius* in India .

4}The present parasites differs from *S. lucknowensis* Johri,1956 in having hooks 36-48 in numbers, ovary post equatorial, vitellaria lobulate and discontinuous in two groups.

5}The present cestode differs from *S.malayana* Furnando and Furtado, 1964 in having scolex circular, hooks 60 in numbers, ovary slightely bilobed, post equatorial, vitellaria lobate, discontinuous in two groups and reported from *Channa striata*, in Malacca

6}The present tapeworm differs from *S.parva* Furnando and Furtado, 1964 in having hooks 38-40 in numbers, testes 150-180 in numbers and reported from *Channa micropeltis*, in Malacca.

7} The present cestode differs from *S. pahangensis* Furtado et. al., 1971 in having triangular scolex, hooks 52 in numbers, neck short, segmentation clear, testes laterally situated in the proglottids, vitellaria lobulated and reported from *Channa micropeltis*, in Tasek, Bera.

8} The present tapeworm differs from *S. visakhapatanamensis* Ramadevi et. al., 1973 in having circular scolex, hooks 46-52 in numbers, testes 50-55 in number, vitellaria lobulated and reported from *Ophiocephalus punctatus,* in India.

9}The present worm differs from *S. khami* Deshmukh and Shinde,1980 having scolex rectangular, oval, shallow bothria, hooks 55-57 in numbers, short neck, testes rounded, 155 in numbers and arranged in two fields, cirrus pouch is elongated, vitellaria follicular and reported from *Ophiocephalus marulius,* in India.

10} The present cestode differs from *S. aurangabadensis* Jadhav et. al., 1980 in having oval scolex, hooks 50-52 in numbers; in two half rows, overlapping on each other, mature segment broader than long, testes 240-260 in numbers and vitellaria follicular.

11} The present tapeworm differs from *S. godavarii* Shinde et. al., 1980 in having hooks 40-42 in numbers, arranged in two half rows, testes rounded, 220-230 in numbers, cirrus pouch is oval, situated in anterior half of the segment and vitellaria follicular.

12}The present worm differs from *S. paithanensis* Kadam et. al., 1981 which shows prominent, large, triangular scolex, hooks 54 in numbers, neck present, testes oval to rounded, 130-135 in numbers, arranged in two lateral groups, vagina posterior to cirrus pouch and vitellaria follicular.

13}The present cestode differs from *S. raoi* Majid and Shinde,1984 in having hooks 46 in numbers, testes 65-170 in numbers, vagina posterior to cirrus pouch and reported from *Channa punctatus*, in India.

14}The present cestode differs from *S.jagannathae* Majid and Shinde,1984 in having hooks 44 in numbers, testes 240 - 250 in numbers, ovary compact, vagina anterior to cirrus pouch and reported from *Channa punctatus,* in India.

15}The present parasite differs from *S. gachuae* Jadhav et. al.,1991in having hooks 22-25 in numbers, neck present, testes 60-70 in numbers, vitellaria follicular and reported from *Channa gachua,* in India.

16}The present cestode differs from *S. maharashtrii* Jadhav et. al., 1991 which shows muscular scolex, hooks 45-46 in numbers, large, arranged in two half crowns, testes oval 80-90 in numbers and vitellaria follicular.

17}The present worm differs from *S.chauhani* Monzer Hasnain,1992 in having scolex oval, hooks 40-44 in numbers and testes 200-210 in numbers, vitellaria non lobate and reported from *Channa punctatus,* in India.

18}The present cestode differs from *S. mohekarae*, Tat and Jadhav,1997 which shows elongated scolex, hooks 151 in numbers, neck short and broad, testes 300-310 in numbers and vitellaria follicular.

19}The present parasite differs fom *S. armatusae* Hiware,1999 in having scolex triangular, hooks 32-40 in numbers, vagina anterior to cirrus pouch and vitellaria follicular.

20}The present cestode differs from *S. tappi* Patil et. al., 2003 which is having triangular scolex, hooks 42-44 in numbers, neck is very short and squarish, testes 285-295 in numbers, small, rounded, distributed in 2 fields, vagina anterior to cirrus pouch and vitellaria follicular.

21} The present parasite differs from *S.ayodhensis* Pande et. al., 2006 in having conical scolex, hooks 29 in numbers, testes numerous, vitellaria follicular and reported from *Amphinuous cuchia*, in India.

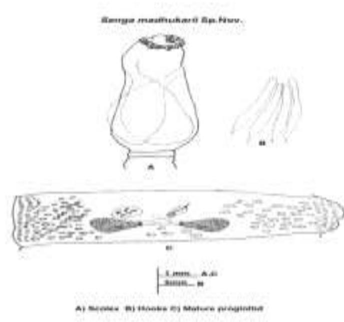
22} The present cestode differs from *S.baughi* Pande et. al., 2006 in having hooks 28 in numbers, neck present, testes 40-50 in numbers, ovary compact, vitellaria follicular and reported from *Rita rita*, in India.

23} The present worm differs from *S.panzarensis* et.al. 2008, having scolex triangular, no.of hooks 58, neck absent, testes 40-45, ovary compact, vitellaria 4-5 lateral side reported from *Mastacembelus armatus* in India.

24} The present worm differs from *S.madhavii* Bhure et.al. 2010 having scolex triangular, hooks 40-42 in numbers, testes 200-225 in numbers, vitellaria granular reported from *Mastacembelus armatus* in India.

25} The present worm differs from *S.rupchandensis* Pardeshi et.al. 2011, having scolex tubular, hooks 42-45 in numbers, testes 350-370 in numbers. Reported from *Channa striatus*.

26} The present worm differs from *S. mastacembelusae* Sp.Nov. having solex triangular, hooks 20-22. Mature segment rectangular, genital pore rounded, which are reported from *Mastacembelus armatus* in India.



A Key to the species of the genus S*enga* Dollfus, 1934

	Neck present	-	1
	Neck absent	-	2
1)	Scolex circular	-	*S.malayana*, Furnando and Furtado, 1964.
	Scolex rectangular	-	*S. khami*, Deshmukh and Shinde, 1980.
	Scolex triangular	-	3
	Scolex pear shaped	-	4
	Scolex oval	-	5
2)	Scolex circular	-	*S.visakhapatnamensis*, Ramadevi et.al.1973.
	Scolex conical	-	*S. ayodhensis*, Pande et.al. 2006.
	Scolex cylindrical	-	***S. madhukarii* Sp.Nov.**
	Scolex tubular	-	*S. rupchandensis* Pardeshi 2011.
	Scolex elongated	-	*S. pcynomera*, Woodland 1924.
	Scolex oval	-	6
	Scolex pear shaped	-	7
	Scolex triangular	-	8
3)	Vitellaria follicular	-	9
	Vitellaria lobulate	-	*S.pahangensis*, Furtado et.al. 1971.
4)	Testes below 50	-	*S.baughi*, Pande et.al. 2006

	Testes above 50	-	*S. gachuae*, Jadhav et.al 1999
	Testes in bet^{n} 100-200	-	*S.parva*, Furnando and Furtado, 1964
	Testes in bet^{n} 200-300	-	*S.jagannathae*, M. A. Majid and G. B. Shinde, 1984.
5)	Hooks below 100	-	*S. chauhani*, Monzer Hasnain, 1992
	Hooks above 100	-	*S.mohekarae*, Tat and Jadhav, 1997
6)	Testes below 100	-	*S.maharashtrii*, Jadhav and Tat 1991
	Testes above 100	-	*S. aurangabadensis*, Jadhav et.a1980
7)	Vitellaria lobulate	-	10
	Vitellaria follicular	-	*S.godavarii*, Shinde et.al. 1980.
	Vitellaria granular	-	*S.raoi*, M. A. Majid and Shinde1984
8)	Testes below 100	-	*S. panzarensis*, Kalse. A. T 2009.
	Testes in bet^{n}100-150	-	11
	Tetses in bet^{n} 150-200	-	*S. besnardi*, Dollfus, 1934
	Testes in bet^{n} 200-250	-	12
9)	Hooks below 50	-	*S. tappi*, D. N. Patil 2003.
	Hooks above 50	-	*S. paithanensis*, Kadam et.al. 1981.
10)	Hooks below 50	-	*S. luknowensis*, Johri, 1956
	Hooks above 50	-	*S. ophiocephalina*, T seng, 1933
11)	Vitellaria follicular	-	*S. armatusae*, C. J. Hiware, 1991
	Vitellaria granular	-	*S. madhavii*, Bhure et.al. 2010

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